IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§ Group Art Unit: 2186
Richard A. Dayan, *et al.*	§
	§ Examiner: Patel, Hetul B.
Serial No.: 10/798,091	§
	§ Atty Docket No.: RPS920030208US1
Filed: 03/11/2004	§
	§ Customer No.: 56102
Title: System and Method to Reduce Disk	§
Access Time During Predictable	§ Confirmation No.: 6065
Loading Sequences	

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Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

APPEAL BRIEF

Honorable Commissioner:

This is an Appeal Brief filed pursuant to 37 CFR § 41.37 in response to the Final Office Action of July 19, 2007 (hereinafter the "Office Action"), and pursuant to the Notice of Appeal filed October 15, 2007.

REAL PARTY IN INTEREST

The real party in interest in accordance with 37 CFR § 41.37(c)(1)(i) is the patent assignee, International Business Machines Corporation ("IBM"), a New York corporation having a place of business at Armonk, New York 10504.

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RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences within the meaning of 37 CFR §
41.37(c)(1)(ii).

STATUS OF CLAIMS

Status of claims in accordance with 37 CFR § 41.37(c)(1)(iii): Twenty (20) claims are
filed in the original application in this case. Claims 1-6 and 8-20 are rejected in the
Office Action. Claims 1-6 and 8-20 are on appeal.

STATUS OF AMENDMENTS

Status of amendments in accordance with 37 CFR § 41.37(c)(1)(iv): No amendments
were submitted after final rejection. The claims as currently presented are included in the
Appendix of Claims that accompanies this Appeal Brief.

SUMMARY OF CLAIMED SUBJECT MATTER

Appellants provide the following concise summary of the claimed subject matter
according to 37 CFR § 41.37(c)(1)(v). This summary includes a concise explanation of
the subject matter defined in each of the independent claims involved in the appeal and
includes references to the specification by page and line number and to the drawings by
elements. The three independent claims involved in this appeal are claims 1, 8, and 14.
Claims 1 is a method claim. Claims 8 and 14 recite counterpart aspects of the method of
claim 1. Claim 8 recites computer program product aspects of the method of claim 1.
Claim 14 recites data processing system aspects of the method of claim 1.

Claim 1 recites a method of loading data from disk in a data processing system. The
method of claim 1 includes comparing a current sequence of disk requests to data
indicative of a previous sequence of disk requests (page 7, lines 11-20; Figure 4, element

208). The method of claim 1 also includes responsive to detecting a match between the current sequence and the previous sequence, storing a copy of data blocks accessed during the current sequence in a contiguous portion of the disk (page 7, lines 21-26; Figure 2, elements 208 and 216). The method of claim 1 also includes responsive to a subsequent request for data in the disk sequence, mapping the request to the sequential portion of the disk and servicing the request from data in the sequential portion (page 8, lines 22-28; Figure 2, element 220). The method of claim 1 also includes wherein the contiguous portion of the disk to which the data is copied is on a different partition of the disk than a disk partition on which the original data is stored (page 8, lines 19-21).

Claim 8 recites a computer program product, comprising a sequence of computer executable instructions stored on a computer readable medium, for booting a data processing system (page 5, lines 20-22). The computer program product of claim 8 includes program code means for recording a sequence of accesses to disk storage during a system boot sequence (page 5, line 25 – page 6, line 6; Figure 2, element 202). The computer program product of claim 8 also includes program code means for copying data blocks accessed during the boot sequence into a contiguous block of the fixed disk (page 7, lines 21-26; Figure 2, elements 208 and 216). The computer program product of claim 8 also includes program code means for routing, during a subsequent boot sequence, the sequence of disk accesses to a sequence of accesses to data in the contiguous block wherein the data retrieved from disk during the subsequent boot sequence is retrieved from the contiguous block (page 8, lines 22-28; Figure 2, element 220). The computer program product of claim 8 also includes wherein the contiguous portion of the disk to which the data is copied is on a different partition of the disk than a disk partition on which the original data is stored (page 8, lines 19-21).

Claim 14 recites a data processing system. The data processing system a processor coupled to a system memory (page 3, line 30 – page 4, line 2; Figure 1, element 102 and 110). The data processing system also includes a disk controller coupled to the processor and memory, and configured to control accesses to disk storage of the system, wherein the disk controller is configured (page 4, lines 8-10; Figure 1, element 145, 102, 110, and

150) to record data indicative of a sequence of disk sectors accessed during operation of the system (page 5, line 25 – page 6, line 6; Figure 2, element 202). The disk controller is also configured to copy the sectors accessed during the sequence into a contiguous block of the disk responsive to detecting the same disk access sequence occurring (page 7, lines 21-26; Figure 2, element 208 and 216). The disk controller is also configured to responsive to a subsequent access to a disk sector in the sequence of disk sectors, servicing the request from the contiguous block (page 8, lines 22-28; Figure 2, element 220). The disk controller is also configured to wherein the contiguous portion of the disk to which the data is copied is on a different partition of the disk than a disk partition on which the original data is stored (page 8, lines 19-21).

GROUNDS OF REJECTION

In accordance with 37 CFR § 41.37(c)(1)(vi), Appellants provide the following concise statement for each ground of rejection:

1. Claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 stand rejected for obviousness under 35 U.S.C. § 103(a) as being unpatentable over Zwiegincew, *et al.* (U.S. Patent 6,633,968) in view of Brady, *et al.* (U.S. Patent 5,758,050).

2. Claims 2, 9, and 16 stand rejected for obviousness under 35 U.S.C. § 103(a) as being unpatentable over Zwiegincew in view of Brady in further view of Hung (U.S. Patent 5,247,653).

3. Claims 4-5, 12, and 19 stand rejected for obviousness under 35 U.S.C. § 103(a) as being unpatentable over Zwiegincew in view of Brady in further view of Lee, *et. al.* (U.S. Patent Application No. 2004/0260909).

4. Claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 stand rejected for obviousness under 35 U.S.C. § 103(a) as being unpatentable over Desai, *et al.* (U.S. Patent 6,789,171) in view of Burr, *et al.* (U.S. Patent Application No. 2004/0225874).

5. Claims 4-5, 12, and 19 stand rejected for obviousness under 35 U.S.C. § 103(a) as being unpatentable over Desai in view of Burr in further view of Lee.

ARGUMENT

Appellants present the following argument pursuant to 37 CFR § 41.37(c)(1)(vii) regarding the ground of rejection on appeal in the present case.

**Argument Regarding The First Ground Of Rejection On Appeal:
Claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 Are Rejected Under 35 U.S.C. § 103(a)
As Being Unpatentable Over Zwiegincew In View Of Brady**

Claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Zwiegincew, *et al.* (U.S. Patent 6,633,968) (hereafter "Zwiegincew") in view of Brady, *et al.* (U.S. Patent 5,758,050) (hereafter "Brady"). The question of whether Appellants claims are obvious *vel non* is examined in light of: (1) the scope and content of the prior art; (2) the differences between the claimed invention and the prior art; (3) the level of ordinary skill in the art; and (4) any relevant secondary considerations, including commercial success, long felt but unsolved needs, and failure of other. *KSR Int'l Co. v. Teleflex Inc.*, No. 04-1350, slip op. at 2 (U.S. April 30, 2007). Although Appellants recognize that such an inquiry is an expansive and flexible one, the Office Action must nevertheless demonstrate a prima facie case of obviousness to reject Appellants claims under for obviousness under 35 U.S.C. § 103(a). *In re Khan*, 441 F.3d 977, 985-86 (Fed. Cir. 2006). To establish a prima facie case of obviousness, the proposed combination of Zwiegincew and Brady must teach or suggest all of Appellants' claim limitations. *Manual of Patent Examining Procedure* § 2142 (citing *In re Royka*, 490 F.2d 981, 985, 180 USPQ 580, 583 (CCPA 1974)). As shown below in more detail, the proposed combination of Zwiegincew and Brady cannot establish a prima facie case of obviousness because the proposed combination of Zwiegincew and Brady does not teach each and every element of the claims of the present application. The rejection of claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 should therefore be withdrawn and the

claims should be allowed. Appellants respectfully traverse each rejection individually and request reconsideration of claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20.

<p style="text-align:center;">**The Proposed Combination Of Zwiegincew And Brady
Does Not Disclose Or Suggest Each And Every
Element Of Claim 1 Of The Present Application**</p>

Independent claim 1 of the present application recites:

1.   A method of loading data from disk in a data processing system, comprising:

comparing a current sequence of disk requests to data indicative of a previous sequence of disk requests;

responsive to detecting a match between the current sequence and the previous sequence, storing a copy of data blocks accessed during the current sequence in a contiguous portion of the disk; and

responsive to a subsequent request for data in the disk sequence, mapping the request to the sequential portion of the disk and servicing the request from data in the sequential portion;

wherein the contiguous portion of the disk to which the data is copied is on a different partition of the disk than a disk partition on which the original data is stored.

<p style="text-align:center;">**Zwiegincew Neither Discloses Nor Suggests
The First Three Elements Of Claim 1**</p>

The Office Action takes the position that Zwiegincew discloses the first three elements of claim 1 of the present application. The Office Action argued that "the claimed steps of comparing and detecting a match are inherent in the method taught by Zwiegincew

because Zwiegincew discloses that the order in which the pages are accessed (i.e. the sequence of the disk requests) is determined based on the assumption that the disk access patterns are similar from run to run (i.e. at least one match in the sequence of disk requests is found and it is assumed that the same sequence will be called again in the next/future run) …" The Office Action then cites Zwiegincew at column 2, lines 11-24, against the independent claim. Zwiegincew at column 2, lines 11-24, states:

> Another prior solution involves strategically ordering pages in disk storage. According to this prior solution, the order in which pages will likely be accessed during typical usage of an application program is determined based on the assumption that disk access patterns are similar from run to run. Then, pages are stored in disk storage in the determined order. A strategic ordering of pages will result in a reduction of hard page fault times. However, this approach is somewhat limited by the fact pages may be accessed more than once by an application program. Therefore, additional hard page faults may occur when a particular page must be re-retrieved from disk storage. Strategically ordering pages in disk storage tends to work best when it is employed to reduce hard page faults in a single hard page fault scenario, typically boot.

That is, Zwiegincew discloses methods of reducing "hard page fault times," which are random access memory faults. As disclosed in Zwiegincew – and as is well known in the art generally – a hard page fault or a random access memory fault is a failure to find memory in RAM. Which is to say that a random access memory fault is not a disk access. A random access memory fault may be a cause of a disk access, but Zwiegincew's discussion of ways of reducing hard page fault times for random access memory faults in no way discloses the inventive methods and products for loading data from disk in a data processing system as claimed here.

The discussion in Zwiegincew concerns patterns of hard page fault times, not sequences of disk access. In fact, Zwiegincew at column 2, lines 11-24, emphatically teaches away from the use of patterns of disk access as claimed in the present application by asserting, "However, this approach is somewhat limited by the fact pages may be accessed more than once by an application program. Therefore, additional hard page faults may occur when a particular page must be re-retrieved from disk storage." In fact, storing a copy of

data blocks accessed during the current sequence in a contiguous portion of the disk as claimed in the present application will overcome the problem cited in Zwiegincew at column 2, lines 11-24, by assuring that all of the data blocks accessed during an access sequence are stored in sequence on the disk drive – *regardless whether they involve RAM pages accessed more than once.*

The term "sequence" occurs ten times in Zwiegincew, and each and every reference in Zwiegincew to the term "sequence" is in the context of a "hard page fault sequence." There is not one word in Zwiegincew comparing sequences of disk accesses. To the extent that Zwiegincew is concerned with a "sequence" of any kind, Zwiegincew is totally and exclusively concerned with sequences of hard page faults – which does not disclose the use of disk access sequences as claimed here. More specifically, nothing in Zwiegincew discloses any comparison of a current sequence of disk requests to data indicative of a previous sequence of disk requests. Nothing in Zwiegincew discloses any detecting of a match between a current sequence and a previous sequence or storing a copy of data blocks accessed during the current sequence in a contiguous portion of the disk. And nothing in Zwiegincew discloses mapping of a subsequent request to the sequential portion of the disk as claimed here.

Zwiegincew at column 2, lines 11-24, discloses disk access patterns that are ***assumed*** to be similar from run to run in single hard page fault scenarios, such as, for example, a typical boot of an operating system in which it is sensible to ***assume*** that a number of disk sectors will be required in the same order time after time. Zwiegincew goes on to disclose that such assumed sequences of disk access are unreliable in typical applications because pages may be accessed more than once by an application program so that additional hard page faults may occur when a particular page must be retrieved from disk storage. That is, according to Zwiegincew, simply assuming the occurrence of a particular sequence of disk accesses will not reliably reduce hard memory faults in typical applications. Assuming for the purposes of argument that a sequence of page faults results in some particular sequence of memory accesses, the present invention solves this problem by determining as an actual fact in real time, not an assumption, that

an application is presently actually using disk space in a particular sequence, identifying

the sequence, and making the sequence continguously accessible for faster access – none

of which is disclosed in Zwiegincew.

Because the Office Action does not disclose the first three elements of claim 1, the Office

Action cannot establish a prima facie case of obviousness. The rejections of claims 1, 3,

6, 8, 10-11, 13-15, 17-18, and 20, therefore should be withdrawn, and the claims should

be allowed.

Brady Neither Discloses Nor Suggests Wherein The Contiguous Portion Of The Disk To Which The Data Is Copied Is On A Different Partition Of The Disk Than A Disk Partition On Which The Original Data Is Stored

The Office Action takes the position that Brady at column 2, lines 28-37 discloses the

following limitation of the fourth element of claim 1: wherein the contiguous portion of

the disk to which the data is copied is on a different partition of the disk than a disk

partition on which the original data is stored. Appellants respectfully note in response,

however, that what Brady at column 2, lines 28-37, in fact discloses is:

> The invention affords its users with a number of distinct advantages. First,
> the invention provides flexibility in data management, because the user
> can selectively store data in different storage partitions having different
> operating characteristics. The storage subsystem can therefore be
> optimized based on cost, performance, and availability of its components.
> Moreover, the user saves money by foregoing the purchase of different
> storage subsystems to implement different memory storage devices. With
> the present invention, a pool of data storage devices can be selectively
> apportioned to effectively provide different storage subsystems with
> different operating characteristics, e.g. RAID-5, LSA, non-RAID, etc.

That is, Brady discloses at column 2, lines 28-37, the user can selectively store data in

different storage partitions having different operating characteristics. Brady's user that

can selectively store data in different storage partitions having different operating

characteristics does not disclose wherein the contiguous portion of the disk to which the

data is copied is on a different partition of the disk than a disk partition on which the

original data is stored, as claimed in the present application. Brady only discloses

instances of data stored in different partitions, no copies at all. Brady does not disclose original data on a disk partition and copied data on a different partition as claimed in the present application. Without disclosing or suggesting the fourth element of claim 1, the Office Action cannot establish a prima facie case of obviousness. The rejections of claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 should be withdrawn, and the claims should be allowed.

Argument Regarding The Second Ground Of Rejection On Appeal: Claims 2, 9, and 16 Are Rejected Under 35 U.S.C. § 103(a) As Being Unpatentable Over Zwiegincew In View Of Brady In Further View Of Hung

Claims 2, 9, and 16 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Zwiegincew in view of Brady and further in view of Hung. To reject Appellants' claims for obviousness under 35 U.S.C § 103(a), the Office Action must demonstrate a prima facie case of obviousness. *In re Khan*, 441 F.3d 977, 985-86 (Fed. Cir. 2006). To establish a prima facie case of obviousness, the proposed combination of the references must teach or suggest all of Appellants' claim limitations. *Manual of Patent Examining Procedure* § 2142 (citing *In re Royka*, 490 F.2d 981, 985, 180 USPQ 580, 583 (CCPA 1974)). The Office Action relies on the previous 35 U.S.C. § 103 rejection above to reject dependent claims 2, 9, and 16. Regarding the previous 35 U.S.C. § 103 rejection above, Appellants have demonstrated that the proposed combination of Zwiegincew and Brady does not teach or suggest each and every element of independent claims 1, 8, and 14. Dependent claims 2, 9, and 16 depend from independent claims 1, 8, and 14 and include all of the limitations of the claims from which they depend. Because the proposed combination of Zwiegincew, Brady, and Hung relies on the argument that the proposed combination of Zwiegincew and Brady teaches or suggests each and every element of claims 1, 8, and 14, and because the proposed combination of Zwiegincew and Brady does not teach or suggest each and every element of claims 1, 8, and 14, the proposed combination of Zwiegincew, Brady, and Hung cannot teach or suggest all the claim limitations of claims 2, 9, and 16. The proposed combination of Zwiegincew, Brady, and Hung, therefore, cannot establish a prima facie case of obviousness, and the rejections should be withdrawn.

**Argument Regarding The Third Ground Of Rejection On Appeal:
Claims 4-5, 12, and 19 Are Rejected Under 35 U.S.C. § 103(a) As Being
Unpatentable Over Zwiegincew In View Of Brady In Further View Of Lee**

Claims 4-5, 12, and 19 stand rejected under 35 U.S.C. § 103(a) as unpatentable over
Zwiegincew in view of Brady and further in view of Lee. To reject Appellants' claims for
obviousness under 35 U.S.C § 103(a), the Office Action must demonstrate a prima facie
case of obviousness. *In re Khan*, 441 F.3d 977, 985-86 (Fed. Cir. 2006). To establish a
prima facie case of obviousness, the proposed combination of the references must teach
or suggest all of Appellants' claim limitations. *Manual of Patent Examining Procedure* §
2142 (citing *In re Royka*, 490 F.2d 981, 985, 180 USPQ 580, 583 (CCPA 1974)). The
Office Action relies on the previous 35 U.S.C. § 103 rejection above to reject dependent
claims 4-5, 12, and 19. Regarding the previous 35 U.S.C. § 103 rejection above,
Appellants have demonstrated that the proposed combination of Zwiegincew and Brady
does not teach or suggest each and every element of independent claims 1, 8, and 14.
Dependent claims 4-5, 12, and 19 depend from independent claims 1, 8, and 14 and
include all of the limitations of the claims from which they depend. Because the
proposed combination of Zwiegincew, Brady, and Lee relies on the argument that the
proposed combination of Zwiegincew and Brady teaches or suggests each and every
element of claims 1, 8, and 14, and because the proposed combination of Zwiegincew
and Brady does not teach or suggest each and every element of claims 1, 8, and 14, the
proposed combination of Zwiegincew, Brady, and Lee cannot teach or suggest all the
claim limitations of claims 4-5, 12, and 19. The proposed combination of Zwiegincew,
Brady, and Lee, therefore, cannot establish a prima facie case of obviousness, and the
rejections should be withdrawn.

Relations Among Claims

Independent claims 8 and 14 are computer program product and system claims that
corresponds to independent method claim 1. Claim 1 is allowable for the reasons set
forth above. Claims 8 and 14 are allowable because claim 1 is allowable. The rejections

of claims 8 and 14 therefore should be withdrawn, and claims 8 and 14 should be allowed.

Claims 2-7, 9-13, and 15-20 depend respectively from independent claims 1, 8, and 14. Each dependent claim includes all of the limitations of the independent claim from which it depends. Because the combination of Zwiegincew and Brady does not disclose or suggest each and every element of the independent claims, so also the combination of Zwiegincew and Brady cannot possibly disclose or suggest each and every element of any dependent claim. The rejection of claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 therefore should be withdrawn, and these claims also should be allowed.

Claims 2, 9, and 16, rejected over Zwiegincew in view of Brady further in view of Hung, also should be allowed because they are dependent claims – dependent from independent claims whose elements and limitations are not disclosed or suggested by the combination of Zwiegincew and Brady and therefore cannot be disclosed or suggested by any further combination, including the combination of Zwiegincew, Brady, and Hung.

Claims 4-5, 12, and 19 rejected over Zwiegincew in view of Brady further in view of Lee, also should be allowed because they are dependent claims – dependent from independent claims whose elements and limitations are not disclosed or suggested by the combination of Zwiegincew and Brady and therefore cannot be disclosed or suggested by any further combination, including the combination of Zwiegincew, Brady, and Lee.

**Argument Regarding The Fourth Ground Of Rejection On Appeal:
Claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 Are Rejected Under 35 U.S.C. § 103(a)
As Being Unpatentable Over Desai In View Of Burr**

Claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Desai, et al. (U.S. Patent 6,789,171) (hereafter "Desai") in view of Burr, et al. (U.S. Publication No. 2004/0225874) (hereafter "Burr"). The question of whether Appellants claims are obvious vel non is examined in light of: (1) the scope and content of the prior art; (2) the differences between the claimed invention and the prior

art; (3) the level of ordinary skill in the art; and (4) any relevant secondary considerations, including commercial success, long felt but unsolved needs, and failure of other. *KSR Int'l Co. v. Teleflex Inc.*, No. 04-1350, slip op. at 2 (U.S. April 30, 2007). Although Appellants recognize that such an inquiry is an expansive and flexible one, the Office Action must nevertheless demonstrate a prima facie case of obviousness to reject Appellants claims under for obviousness under 35 U.S.C. § 103(a). *In re Khan*, 441 F.3d 977, 985-86 (Fed. Cir. 2006). To establish a prima facie case of obviousness, the proposed combination of Desai and Burr must teach or suggest all of Appellants' claim limitations. *Manual of Patent Examining Procedure* § 2142 (citing *In re Royka*, 490 F.2d 981, 985, 180 USPQ 580, 583 (CCPA 1974)). As shown below in more detail, the proposed combination of Desai and Burr cannot establish a prima facie case of obviousness because the proposed combination of Desai and Burr does not teach each and every element of the claims of the present application. The rejection of claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 should therefore be withdrawn and the claims should be allowed. Appellants respectfully traverse each rejection individually and request reconsideration of claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20.

**The Proposed Combination Of Desai And Burr
Does Not Disclose Or Suggest Each And Every
Element Of Claim 1 Of The Present Application**

Independent claim 1 of the present application recites:

1. A method of loading data from disk in a data processing system, comprising:

    comparing a current sequence of disk requests to data indicative of a previous sequence of disk requests;

    responsive to detecting a match between the current sequence and the previous sequence, storing a copy of data blocks accessed during the current sequence in a contiguous portion of the disk; and

responsive to a subsequent request for data in the disk sequence, mapping the request to the sequential portion of the disk and servicing the request from data in the sequential portion;

wherein the contiguous portion of the disk to which the data is copied is on a different partition of the disk than a disk partition on which the original data is stored.

Burr Neither Discloses Nor Suggests Storing A Copy Of Data Blocks Accessed During The Current Sequence In A Contiguous Portion Of The Disk

The Office Action takes the position that Burr at paragraphs [0029] and [0030] discloses the following portion of the second element of claim 1: storing a copy of data blocks accessed during the current sequence in a contiguous portion of the disk. Appellants respectfully note in response, however, that what Burr at paragraphs [0029] and [0030], in fact discloses is:

> [0029] With these concepts in mind embodiments of the invention can be further described with reference to FIG. 1A. At 100 BIOS instructions that are copied into DRAM during a first clean boot up process are copied into Boot Flash memory to allow all subsequent booting processes retrieve information from the Boot Flash memory, rather than the hard drive, which would reduce data access times.

> [0030] Thus, if a PC requires a cold reboot due to internal data corruption or due to the PC passing through cold reboot after it was turned off, these successive reboot processes will utilize information stored in the Boot Flash rather than information stored on the hard drive of the PC, which as stated earlier reduces data access times.

That is, Burr discloses at paragraphs [0029] and [0030], BIOS instructions that are copied into DRAM during a first clean boot up process are copied into Boot Flash memory to allow all subsequent booting processes to retrieve information from the Boot Flash memory, rather than the hard drive, which would reduce data access times. Burr's BIOS instructions that are copied into DRAM during a first clean boot up process that are

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copied into Boot Flash memory to allow all subsequent booting processes retrieve information from the Boot Flash memory, rather than the hard drive, which would reduce data access times does not disclose storing a copy of data blocks accessed during the current sequence in a contiguous portion of the disk, as claimed in the present application because Burr's Boot Flash memory is not a contiguous portion of the disk. Burr's Boot Flash Memory is simply another medium like the disk drive where data can be stored in either contiguous or non-contiguous portions. Burr, however, does not disclose storing the data in a contiguous portion of that medium as claimed in the present application. Without disclosing or suggesting storing the data in a contiguous portion, Burr does not disclose or suggest the second element of claim1 and the Office Action cannot establish a prima facie case of obviousness. The rejections of claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 should be withdrawn, and the claims should be allowed.

Burr Neither Discloses Nor Suggests Wherein The Contiguous Portion Of The Disk To Which The Data Is Copied Is On A Different Partition Of The Disk Than A Disk Partition On Which The Original Data Is Stored

The Office Action takes the position that Burr at paragraphs [0029] and [0030] discloses the following limitation of the fourth element of claim 1: wherein the contiguous portion of the disk to which the data is copied is on a different partition of the disk than a disk partition on which the original data is stored. Appellants respectfully note in response, however, that Burr discloses at paragraphs [0029] and [0030], quoted above, BIOS instructions that are copied into DRAM during a first clean boot up process are copied into Boot Flash memory to allow all subsequent booting processes to retrieve information from the Boot Flash memory, rather than the hard drive, which would reduce data access times. Burr's BIOS instructions that are copied into DRAM during a first clean boot up process that are copied into Boot Flash memory to allow all subsequent booting processes retrieve information from the Boot Flash memory, rather than the hard drive, which would reduce data access times does not disclose wherein the contiguous portion of the disk to which the data is copied is on a different partition of the disk than a disk partition on which the original data is stored, as claimed in the present application because Burr's Boot Flash memory is not a contiguous portion of the disk. Burr's Boot Flash Memory is

simply another medium like the disk drive where data can be stored in either contiguous or non-contiguous portions. Burr, however, does not disclose storing the data in a contiguous portion of that medium as claimed in the present application. Without disclosing or suggesting storing the data in a contiguous portion, Burr does not disclose or suggest the fourth element of claim 1 and the Office Action cannot establish a prima facie case of obviousness. The rejections of claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 should be withdrawn, and the claims should be allowed.

**Argument Regarding The Fifth Ground Of Rejection On Appeal:
Claims 4-5, 12, and 19 Are Rejected Under 35 U.S.C. § 103(a) As Being
Unpatentable Over Desai In View Of Burr In Further View Of Lee**

Claims 4-5, 12, and 19 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Desai in view of Burr and further in view of Lee. To reject Appellants' claims for obviousness under 35 U.S.C § 103(a), the Office Action must demonstrate a prima facie case of obviousness. *In re Khan*, 441 F.3d 977, 985-86 (Fed. Cir. 2006). To establish a prima facie case of obviousness, the proposed combination of the references must teach or suggest all of Appellants' claim limitations. *Manual of Patent Examining Procedure* § 2142 (citing *In re Royka*, 490 F.2d 981, 985, 180 USPQ 580, 583 (CCPA 1974)). The Office Action relies on the previous 35 U.S.C. § 103 rejection above to reject dependent claims 4-5, 12, and 19. Regarding the previous 35 U.S.C. § 103 rejection above, Appellants have demonstrated that the proposed combination of Desai and Burr does not teach or suggest each and every element of independent claims 1, 8, and 14. Dependent claims 4-5, 12, and 19 depend from independent claims 1, 8, and 14 and include all of the limitations of the claims from which they depend. Because the proposed combination of Desai, Burr, and Lee relies on the argument that the proposed combination of Desai and Burr teaches or suggests each and every element of claims 1, 8, and 14, and because the proposed combination of Desai and Burr does not teach or suggest each and every element of claims 1, 8, and 14, the proposed combination of Desai, Burr, and Lee cannot teach or suggest all the claim limitations of claims 4-5, 12, and 19. The proposed combination of Desai, Burr, and Lee, therefore, cannot establish a prima facie case of obviousness, and the rejections should be withdrawn.

No Rational Underpinning To
Combine Desai And Burr

Even if the Office Action were to demonstrate that the combination of Desai and Burr teaches or suggest Appellants' claim limitation, which it does not, merely demonstrating that each element of the Appellants' claims are known in the prior art does not prove that Appellants' claims are obvious. *KSR Int'l Co.*, slip op. at 14. The Office Action must articulate some rational underpinning for combining the references. *Id.* Moreover, this rationale must support combining the references to address the subject matter of the present application. *Id.* at 16. The Office Action at page 8 states its rational underpinning for combining Desai and Burr as:

> As described above, the combination of Desai and Burr discloses about stored/copying and then servicing boot data into a flash memory separate from the hard drive. Similarly, it would have been obvious to one of ordinary skills in the art at the time of the current invention was made to storing/copying and then servicing boot data into a different partition of the hard drive as claimed to avoid the use of expensive flash drive.

That is, the Office Action asserts that one of ordinary skill in the art would have combined Desai and Burr because of the desirability of avoiding the use of an expensive flash drive. In response, Appellants respectfully note that the desirability of avoiding the use of an expensive flash drive has nothing to do with the subject matter of the present application—reducing disk access times during predictable loading sequences. The Office Action therefore has not provided any rational underpinning for why one of ordinary skill in the art would combine Desai and Burr *to address the subject matter of the present application.* Without more, the Office Action improperly rejects Appellants' claim under 35 U.S.C. § 103, and Appellants respectfully request that the rejections be withdrawn.

**The Office Action Does Not Examine
Appellants' Claims Pursuant To *Graham***

In addition to the fact that the Office Action has not established a prima facie of
obviousness there is another reason that the rejection of claims 1-6 and 8-20 should be
withdrawn: The Office Action does not examine Appellants' claims in light of the factual
inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). As
mentioned above, the question of whether Appellants' claims are obvious *vel non* is to be
examined in light of the pertinent *Graham* factors: (1) the scope and content of the prior
art, (2) the differences between the claimed invention and the prior art, and (3) the level
of ordinary skill in the art *KSR Int'l Co. v. Teleflex Inc.*, No. 04-1350, slip op. at 2 (U.S.
April 30, 2007); *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). "To
facilitate review, this analysis should be made explicit." *KSR*, slip op. at 14 (citing *In re
Kahn*, 441 F. 3d 977, 988 (Fed. Cir. 2006)). That is, the Office Action must make explicit
an analysis of the factual inquiries required by *Graham*.

In particular in this case, the Examiner has not ascertained the differences between the
prior art and the claims in issue. In each office action, the Examiner has only identified
elements in Applicants' claims not found in one reference and then attempted to find a
similar element in another to support an obviousness rejection. Such analysis is improper
and incomplete. "Ascertaining the differences between the prior art and the claims at
issue requires interpreting the claim language, and considering both the invention and the
prior art references as a whole." MPEP §2141.02. Furthermore, "[i]n determining the
differences between the prior art and the claims, the question under 35 U.S.C. 103 is not
whether the differences themselves would have been obvious, but whether the claimed
invention as a whole would have been obvious." *Id.,* citing *Stratoflex, Inc. v. Aeroquip
Corp.,* 713 F.2d 1530 (Fed. Cir. 1983). The office actions in the present case are
deficient bases for obviousness rejections because the Examiner has only identified
differences between certain elements of Applicants' claims and the references. This
analysis in improper and incomplete because Examiner has not determined whether
Applicants claims as a whole would have been obvious in view of the combinations of

references cited and why the claims as a whole would have been obvious over the references.

In addition, the Examiner has not resolved the level of ordinary skill in the pertinent art. "The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry." MPEP §2141.03 citing *Ryko Mfg. Co. v. Nu-Star, Inc.,* 950 F.2d 714, 718, 21 USPQ2d 1053, 1057 (Fed. Cir. 1991). "The examiner must ascertain what would have been obvious to one of ordinary skill in the art at the time the invention was made, and not to the inventor, a judge, a layman, those skilled in remote arts, or to geniuses in the art at hand." *Id.* citing *Environmental Designs, Ltd. v. Union Oil Co.,* 713 F.2d 693, 218 USPQ 865 (Fed. Cir. 1983), cert. denied, 464 U.S. 1043 (1984). "Factors that may be considered in determining level of ordinary skill in the art include (1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field." *Id.* citing *Environmental Designs, Ltd. v. Union Oil Co.,* 713 F.2d 693, 696, 218 USPQ 865, 868 (Fed. Cir. 1983), cert. denied, 464 U.S. 1043 (1984). The office actions in the present case fail to apply a single factor used to determine the level of ordinary skill in the art.

In conclusion, as a practical matter, the Examiner in this case has made no substantive mention whatsoever of the factual inquiries required by *Graham.* As such, the rejections of claims 1-6 and 8-20 under 35 U.S.C. § 103 are improper and should be withdrawn.

Relations Among Claims

Independent claims 8 and 14 are computer program product and system claims that corresponds to independent method claim 1. Claim 1 is allowable for the reasons set forth above. Claims 8 and 14 are allowable because claim 1 is allowable. The rejections of claims 8 and 14 therefore should be withdrawn, and claims 8 and 14 should be allowed.

Claims 2-7, 9-13, and 15-20 depend respectively from independent claims 1, 8, and 14. Each dependent claim includes all of the limitations of the independent claim from which it depends. Because the combination of Desai and Burr does not disclose or suggest each and every element of the independent claims, so also the combination of Desai and Burr cannot possibly disclose or suggest each and every element of any dependent claim. The rejection of claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 therefore should be withdrawn, and these claims also should be allowed.

Claims 4-5, 12, and 19 rejected over Desai in view of Burr further in view of Lee, also should be allowed because they are dependent claims – dependent from independent claims whose elements and limitations are not disclosed or suggested by the combination of Desai and Burr and therefore cannot be disclosed or suggested by any further combination, including the combination of Desai, Burr, and Lee.

Conclusion of Appellants' Arguments

Claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Zwiegincew in view of Brady. For the reasons set forth above, however, the proposed combination of Zwiegincew and Brady does not render Appellants' claims obvious under 35 U.S.C. § 103. Appellants, therefore, respectfully traverse each rejection individually, request that the rejections be withdrawn, and request that the claims be allowed.

Claims 2, 9, and 16 stand rejected under 35 U.S.C. § 103 as being unpatentable over Zwiegincew in view of Brady in further view of Hung. For the reasons set forth above, however, the proposed combination of Zwiegincew, Brady, and Hung does not render Appellants' claims obvious under 35 U.S.C. § 103. Appellants, therefore, respectfully traverse each rejection individually, request that the rejections be withdrawn, and request that the claims be allowed.

Claims 4-5, 12, and 19 stand rejected under 35 U.S.C. § 103 as being unpatentable over Zwiegincew in view of Brady in further view of Lee. For the reasons set forth above, however, the proposed combination of Zwiegincew, Brady, and Lee does not render Appellants' claims obvious under 35 U.S.C. § 103. Appellants, therefore, respectfully traverse each rejection individually, request that the rejections be withdrawn, and request that the claims be allowed.
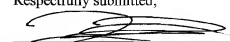
Claims 1, 3, 6, 8, 10-11, 13-15, 17-18, and 20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Desai in view of Burr. For the reasons set forth above, however, the proposed combination of Desai and Burr does not render Appellants' claims obvious under 35 U.S.C. § 103. Appellants, therefore, respectfully traverse each rejection individually, request that the rejections be withdrawn, and request that the claims be allowed.

Claims 4-5, 12, and 19 stand rejected under 35 U.S.C. § 103 as being unpatentable over Desai in view of Burr in further view of Lee. For the reasons set forth above, however, the proposed combination of Desai, Burr, and Lee does not render Appellants' claims obvious under 35 U.S.C. § 103. Appellants, therefore, respectfully traverse each rejection individually, request that the rejections be withdrawn, and request that the claims be allowed.

In view of the arguments above, reversal on all grounds of rejection is requested.

The Commissioner is hereby authorized to charge or credit Deposit Account No. 50-0563 for any fees required or overpaid.

Respectfully submitted,

Date: December 14, 2007   By:

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**APPENDIX OF CLAIMS
ON APPEAL IN PATENT APPLICATION OF
RICHARD ALAN DAYAN, *ET AL.*, SERIAL NO. 10/798,091**

CLAIMS

What is claimed is:

1.   A method of loading data from disk in a data processing system, comprising:

comparing a current sequence of disk requests to data indicative of a previous sequence of disk requests;

responsive to detecting a match between the current sequence and the previous sequence, storing a copy of data blocks accessed during the current sequence in a contiguous portion of the disk; and

responsive to a subsequent request for data in the disk sequence, mapping the request to the sequential portion of the disk and servicing the request from data in the sequential portion;

wherein the contiguous portion of the disk to which the data is copied is on a different partition of the disk than a disk partition on which the original data is stored.

2.   The method of claim 1, further comprising recording a sequence of disk accesses, wherein recording the sequence includes recording the disk address of each block accessed and the length of each block.

3.   The method of claim 1, wherein storing a copy of data blocks accessed during the I/O sequence comprises storing the data blocks sequentially in the order that the data blocks were accessed chronologically.

4.   The method of claim 3, further comprising, responsive to retrieving data from the contiguous portion, prefetching additional data from the contiguous portion of the disk and caching the additional data in a buffer.

5.   The method of claim 4, further comprising, responsive to an I/O request, determining whether the data requested resides in the buffer and, if so, retrieving the data from the buffering without accessing the hard disk.

6.   The method of claim 1, wherein the sequence of disk requests includes the sequence of disk requests following a power-on event.

Claim 7 (Cancelled)

8.   A computer program product, comprising a sequence of computer executable instructions stored on a computer readable medium, for booting a data processing system, the program product comprising:

program code means for recording a sequence of accesses to disk storage during a system boot sequence;

program code means for copying data blocks accessed during the boot sequence into a contiguous block of the fixed disk; and

program code means for routing, during a subsequent boot sequence, the sequence of disk accesses to a sequence of accesses to data in the contiguous block wherein the data retrieved from disk during the subsequent boot sequence is retrieved from the contiguous block;

wherein the contiguous portion of the disk to which the data is copied is on a different partition of the disk than a disk partition on which the original data is stored.

9.   The computer program product of claim 8, further comprising recording a sequence of disk accesses, wherein recording the sequence includes recording the disk address of each block accessed and the length of each block.

10.   The computer program product of claim 8, wherein the program code means for copying data blocks accessed during the boot sequence includes copying data blocks accessed during the boot sequence to the contiguous portion in the order that the blocks were accessed chronologically.

11.   The computer program product of claim 8, wherein the contiguous portion of the disk to which the data is copied is on a different partition of the disk than the original data.

12.   The computer program product of claim 8, further comprising code means for prefetching data during the subsequent boot sequence and storing the prefetched data into a buffer wherein at least some of the disk requests of the subsequent boot sequence are serviced by the buffer without retrieving data from the disk.

13.   The computer program product of claim 8, further comprising code means for updating, in response to a modification of data in the boot sequence, the data in both the original data block and the copied data block.

14.   A data processing system, comprising:

        a processor coupled to a system memory;

a disk controller coupled to the processor and memory, and configured to control accesses to disk storage of the system, wherein the disk controller is configured to:

record data indicative of a sequence of disk sectors accessed during operation of the system;

copy the sectors accessed during the sequence into a contiguous block of the disk responsive to detecting the same disk access sequence occurring; and

responsive to a subsequent access to a disk sector in the sequence of disk sectors, servicing the request from the contiguous block;

wherein the contiguous portion of the disk to which the data is copied is on a different partition of the disk than a disk partition on which the original data is stored.

15. The system of claim 14, wherein the sequence of disk accesses represents the sequence of disk accesses that occur following power on.

16. The system of claim 14, further comprising recording a sequence of disk accesses, wherein recording the sequence includes recording the disk address of each block accessed and the length of each block.

17. The system of claim 14, wherein the program code means for copying data blocks accessed during the boot sequence includes copying data blocks accessed during the boot sequence to the contiguous portion in the order that the blocks were accessed chronologically.

18. The system of claim 14, wherein the contiguous portion of the disk to which the data is copied is on a different partition of the disk than the original data.

19.   The system of claim 14, further comprising code means for prefetching data during the subsequent boot sequence and storing the prefetched data into a buffer wherein at least some of the disk requests of the subsequent boot sequence are serviced by the buffer without retrieving data from the disk.

20.   The system of claim 14, further comprising code means for updating, in response to a modification of data in the boot sequence, the data in both the original data block and the copied data block.

APPENDIX OF EVIDENCE
ON APPEAL IN PATENT APPLICATION OF
RICHARD ALAN DAYAN, *ET AL.*, SERIAL NO. 10/798,091

This is an evidence appendix in accordance with 37 CFR § 41.37(c)(1)(ix).

There is in this case no evidence submitted pursuant to 37 CFR §§ 1.130, 1.131, or 1.132, nor is there in this case any other evidence entered by the examiner and relied upon by the Appellants.

RELATED PROCEEDINGS APPENDIX

This is a related proceedings appendix in accordance with 37 CFR § 41.37(c)(1)(x).
There are no decisions rendered by a court or the Board in any proceeding identified
pursuant to 37 CFR § 41.37(c)(1)(ii).